

Application Number 10/706,624
Amendment dated [day month year]
Reply to Office Action of 19 October 2004

Remarks

No claims have been added or cancelled in this response. Therefore, Claims 1–17 remain pending in this application.

Claim Rejections Under 35 U.S.C. § 103.

Claims 1–17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the disclosed prior art in this application in view of U.S. Patent 6,133,076 ("Yamazaki"). Claims 1, 7 and 12 are independent. Claims 2–6 depend from Claim 1, Claims 8–11 depend from Claim 7, and Claims 13–17 depend from Claim 12.

Initially, Applicants have amended the claims to clarify connections between the batch etch chamber or process and the use of the microwave generator. Any "inherent" teachings of microwave heating are irrelevant to this specific combination. Applicants submit that the amendments are fully supported by the application as filed.

The Examiner has referred to paragraphs [0010] and [0011] of this application as teaching that "the claimed contaminants can be heated insitu [sic] in a plasma chamber but [that] the heating takes 'a significant amount of time'".

Yamazaki discloses batch methods for forming semiconductor structures on insulating substrates, such as glass substrates (1:6–8 and 12:54–58). In the disclosed methods, an amorphous silicon film is formed on a glass substrate, and then is modified into a crystalline silicon film by applying microwaves thereto (2:1–7). Specifically, microwaves are absorbed by silicon-hydrogen bonds in the amorphous silicon film, thereby heating the film and modifying its crystallinity (2:20–23).

The Examiner has combined the teachings of this application as cited above with the teachings of Yamazaki to reach the conclusion that "it would [sic: would] have been obvious to modify the disclosed [sic] prior art to use microwaves in lieu of conventional heaters, since such modification would produce a faster and more efficient heating of wafers".

Applicants note that all of the independent claims—Claims 1, 7 and 12—recite methods "for etching semiconductor wafers using a batch-type etching device...." While

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It is known that residual adsorbates can be desorbed and removed by heating, there is no teaching in the prior art that microwaves can be used for such heating in this context. As the Examiner has acknowledged, the present application recognizes the lack of such teaching in the prior art. Furthermore, Yamazaki certainly does not provide such teaching. Yamazaki discloses that the crystallinity of an amorphous silicon film deposited on a glass substrate can be improved by exposure to microwave energy in a batch process. This is a completely different application for microwave energy as compared to the methods for etching semiconductor wafers recited in the pending claims. Certainly there can be no motivation to modify a post-etch cleaning process to use microwave energy based solely on Yamazaki's use of microwave energy in a completely different application. Specifically, the Examiner has pointed to no suggestion in Yamazaki that microwaves should be used to heat wafers to remove residual adsorbates.

In view of the foregoing remarks, the Applicants submit that this application is in condition for allowance, and respectfully request the same. If, however, some issue remains that the Examiner feels can be addressed by an Examiner's Amendment, the Examiner is cordially invited to call the undersigned for authorization.

Respectfully submitted,

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